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journal homepage: www.elsevier.com/locate/econmodLending conditions in EU: The role of credit demand and supply[☆]Svatopluk Kapounek^{a,*}, Zuzana Kučerová^b, Jarko Fidrmuc^{c,d,e}^a Mendel University in Brno, Faculty of Business and Economics, Zemědělská 1, 613 00 Brno, Czech Republic^b VŠB - Technical University of Ostrava, Faculty of Economics, Sokolská třída 33, 702 00 Ostrava, Czech Republic^c Henan University in Kaifeng, School of Economics, MingLun Street, 475001 Kaifeng, Henan, China^d Zeppelin University Friedrichshafen, Am Seemooser Horn 20, 88045 Friedrichshafen, Germany^e Institute of East and Southeast European Studies (IOS), Landshuter Str. 4, 93047 Regensburg, Germany

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ABSTRACT

We analyse the bank lending activity after the financial crisis and focus on bank-specific supply factors. Using a rich microeconomic dataset from Bankscope and macroeconomic shocks data, we employ OLS and 2SLS fixed effects models with banking controls, macroeconomic shocks and institutional quality. The banks' loan-rate spreads increased despite the recent policy of low interest rates and quantitative easing. We use the bank asset quality as instruments to capture exogenous changes in loan supply. The empirical evidence shows that loan-rate spread and through this the supply of loans is negatively affected by a low asset quality and capital ratios.

1. Introduction

The financial crisis in 2007–2008 has caused a severe banks' liquidity shortage and a subsequent credit crunch. Several authors (e.g. Gambacorta and Marques-Ibanez, 2011) note that the crisis revealed that macroeconomic research has so far neglected the importance of financial intermediaries (banks) as a potential source of frictions in the monetary transmission mechanisms. This paper aims to extend this line of research. Since the crisis, there is a vast body of literature on the global transmission of past financial crises which mostly finds strong evidence for the transmission of global shocks to liquidity and global capital flows (e.g. Brunnermeier, 2009; Brunnermeier and Pedersen, 2009; Calvo, 2009 or Kalemli-Ozcan et al., 2013). Previous research on this topic documents the existence of a worldwide slowdown of credit flows which has negatively affected investment activities and growth.

However, the traditional transmission channels may have been weakened, in recent years, by financial innovations, deregulation, an increasing bank disintermediation and financial distress, as a result of

the financial crisis (Gambacorta and Marques-Ibanez, 2011). Loan securitisation influenced these channels as a result of increasing bank balance sheet liquidity (Loutskina and Strahan, 2009). The crisis has influenced both lenders and borrowers through different channels. There are two partial effects within the credit channel (Kishan and Opiela, 2000). First, macroeconomic shocks or tight monetary policy have an impact on borrowers' balance sheets through the raise of interest rates (broad credit channel). Thus, shocks affect the cost and availability of credit and limit the supply of credit. Second, tight monetary policy can influence the level of bank capital as it increases the cost of funds faced by banks and, in turn, the cost of funds faced by borrowers as a part of the bank lending channel (narrow credit channel). Lastly, higher capital requirements faced by banks also influence the level of bank capital and the ability of banks to supply credit. Moreover, deBondt and Marques-Ibanez (2005) argue that the bank lending channel has also changed due to the developments in the financial markets, e.g. alternative forms of funding for firm in the corporate bond market.

In particular, tighter liquidity conditions, output decline and

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increased credit risk have revealed a high degree of heterogeneity within the EU. Moreover, monetary policy-makers' choices of tools and actions may differ greatly depending on whether the aim is to affect loan supply, loan demand, or both. However, the estimation of supply and demand factors is one of the most difficult issues because nearly all factors may have simultaneous effects on both the supply and demand for credit. After the financial crisis, the ECB and nearly all EU central banks decreased their policy interest rates and provided additional liquidity to banks through open market operations and, more recently, through the policy of quantitative easing. Despite the reduction of policy interest rates, the banks did not change loan rates to the same degree. Instead, they responded to increased risk by higher interest margins. Therefore, it is particularly important to investigate how the supply of loans is influenced by bank risk (or higher risk premia) and asset quality.

The consequences of the current crises in the Euro area contributed to the rising fear that capital needs and funding pressures faced by Western European banks may intensify pressure to deleverage in this region. Therefore, a better understanding of the transmission process is one of the most important issues related to the recent financial crisis, especially from the perspective of a European recovery. This reflects also the fact that European economies are more reliant on bank credit and bank intermediation of savings than the United States and the rest of the world.

We analyse several effects of liquidity changes on credit flows which are driven by the level of capital of individual banks. A sufficiently capitalised bank or a bank with an access to additional sources of capital should be able to accommodate possible funding liquidity shocks without reducing its assets and lending activity. However, the banks have often to adjust their assets in order to keep a constant capital ratio. In such a case, a bank loss may result in a reduction in the level of assets with the required decrease equal to the size of the capital loss scaled up by the inverse of its capital/leverage ratio (Fidrmuc et al., 2015).

Therefore, the objective of this paper is to identify the link between macroeconomic shocks and related bank risk, the institutional environment and the responses of the banking sector to the financial crisis within the EU countries. We focus on the impact of bank liquidity conditions and asset quality which are supply factors of the bank lending activities in the EU. In particular, we use loan-rate spreads as a proxy for loan prices (Bassett et al., 2014). Similarly to Cosimano and Hakura (2011) and Barajas et al. (2015), we can see that the semi-elasticity of loan demand has become negative and high since the crisis. Finally, in our analysis, we also analyse the impact of some selected institutional factors. The advantage of our data set is that we can use a comparatively long time dimension (2000 to 2013), but also that we can compare the importance of these factors to the situation before and after the financial crisis in order to assess the period of loose monetary policy after the crisis. Moreover, we also distinguish between large and small banks in the monetary transmission process. The results of our analysis indicate that the lending process of large banks is more influenced by higher bank risk.

Our paper makes three main contributions to the literature on lending activities in the EU. First, we identify the main supply and demand factors influencing lending activity of European banks. According to our results the main supply factor is the loan rate spread (as a proxy of market risk). Second, we distinguish between large and small banks, partly following the approach of Kashyap and Stein (1995, 2000) or Gambacorta and Marques-Ibanez (2011). Finally, we examine both the pre-crisis and post-crisis period in order to capture the change in the behaviour of banks. Our results suggest that supply factors are particularly important in case of large banks, while the behaviour of small banks is more influenced by demand factors.

The remainder of the paper is organised as follows. Section 2 contains the literature review. An overview of methods and data is provided in Section 3 where the empirical model is introduced and the

variables are defined. Section 4 presents the results of the econometric model. In Section 5, the robustness analysis is performed. Section 6 presents some concluding remarks and further research.

2. Literature review

There are four main approaches, used in the recent literature, to analyse whether the lending activity of the commercial banking system is influenced by demand factors or supply factors: (1) bank lending surveys related to lending standards set by bank managers for short horizons (Rajan, 1994; Asea and Blomberg, 1998; Berger and Udell, 2004; Ruckes, 2004), (2) the semi-elasticity of loan demand using instrumental variables (Cosimano and Hakura, 2011; Bassett et al., 2014; Barajas et al., 2015), (3) the disequilibrium model of credit demand and supply to test the credit crunch hypothesis (Clower, 1965; Barro and Grossman, 1971; Benassy, 1975; Drèze, 1975; Maddala and Nelson, 1974), (4) two cointegrating relationships representing loan demand and supply (Hülsewig et al., 2006; de Mello and Pisu, 2010).

In addition, there are different transmission channels and bank lending activity determinants discussed in the literature. The first studies on bank lending channels focus on banks in the United States. Kashyap and Stein (1995) find that US banks lower lending in reaction to monetary policy tightening. Moreover, smaller banks with less access to uninsured funds are more strongly influenced by monetary policy actions. Kashyap and Stein (2000) show that small and less liquid banks with low securities holdings react more strongly to monetary policy shocks. Kishan and Opiela (2000) document that banks in the United States limited the supply of loans after monetary policy tightening as a result of low levels of bank capital, and that small and less-capitalised banks are more responsive to monetary policy actions.

Moreover, the level of bank capital was often identified as a key factor for the linkage between financial conditions and real economic activity. Gambacorta and Marques-Ibanez (2011) find that selected bank-specific characteristics can have a significant impact on the supply of credit. Furthermore, banks with a lower level of core capital (measured using a Tier 1 ratio), a higher liquidity dependence on market funding and non-interest sources of income lowered the supply of loans even further during the crisis with respect to other banks. Popov and Udell (2012) present an empirical analysis of 16 emerging European countries. They analyse the sensitivity of credit supply to banks' financial conditions and find that a decline in banking equity, Tier 1, capital and losses on financial assets reduced the credit flows to firms during the crisis. Berrospide and Edge (2010) apply a number of different panel estimation methods to examine how bank capital influences the extension of a bank credit. Their empirical results show modest effects of capital shortfalls and capital ratios on loan growth. They find that more important roles of other factors, such as economic activity and increased perception of riskiness by banks, should be studied.

The different effects of liquidity changes on capital flows are given by the quality of domestic institutions, country risk, strength of domestic macroeconomic fundamentals and other factors. Fratzscher (2012) finds that these effects are highly heterogeneous across countries. Djankov et al. (2007) show that creditor protection is associated with more developed financial systems. In a related study, Djankov et al. (2008) show that financial development is also related to debt enforcement rules. Property rights and enforcement rules are especially important for transition economies where new institutions were created (Raiser et al., 2000). Beck and Levine (2002) confirm the impact of the overall financial development and legal system efficiency on capital allocation and also industry growth and new establishment formation across industries. In fact, they recommend focusing on institutional variables, i.e. as a more useful approach. Uzunkaya (2012) studies the role of institutions in the context of the structure of a financial system and concludes that market-based systems work

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